



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SCO 410/SIT 411 DISTRIBUTED SYSTEMS

DATE: 19/1/2021

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain the following terms as used in distributed systems
 - i) Cluster Computing Systems (2 marks)
 - ii) Grid Computing Systems (2 marks)
- b) Diagnose two Drawbacks of synchronous communication (4 marks)
- c) Explain why we need Distributed Systems? (6 marks)
- d) By the use of well labeled diagrams, Discuss how Asynchronous RPCs is accomplished (6 marks)
- e) Explain two advantages of a stateless distributed file server? (4 marks)
- f) Discuss three Types of Distributed Systems (6 marks)

QUESTION TWO (20 MARKS)

- a) What is “a Message Broker” as used in Message-Oriented Communication in distributed systems (2 marks)
- b) Under what circumstances might RPC-based program be less efficient than a carefully optimized message-based program? (10 marks)
- c) Discuss the design goals of distributed systems (8 marks)

QUESTION THREE (20 MARKS)

- a) Edge-server architectures are instances of Client-server combined with P2P are often used for Content Delivery Networks. Using well labeled diagrams, evaluate the concept behind this analogy. (10 marks)
- b) If the caller machine (client) in an RPC crashes while waiting for a reply, we say that the computation which was initiated on the callee machine is an "orphan". Properly terminating orphan computations is called the orphan elimination problem. What sort of issues makes orphan elimination difficult in RPC systems? (10 marks)

QUESTION FOUR (20 MARKS)

- a) Discuss the advantages of Openness in distributed systems (10 marks)
- b) How are the issues of partial failure and consistency maintenance related in a distributed system? (10 marks)

QUESTION FIVE (20 MARKS)

- a) Analyse three dimensionality Measurements of scalability in distributed systems (6 marks)
- b) Describe the various Distribution Transparencies in distributed systems (8 marks)
- c) Discuss three Types of Distributed Systems (6 marks)